

# Diet Quality Index in Kidney Health and Kidney Disease



ELEVATED MALNUTRITION RISK is a frequent finding in individuals on hemodialysis (HD)<sup>1</sup> and a range of protein-energy wasting (PEW) prevalence has been estimated at 28%–54%.<sup>2</sup> The etiology of PEW is multifactorial, with both metabolic and dietary contributors.

To estimate dietary intake and its association with PEW in HD patients, the appropriate dietary intake method must be selected. Methods for measuring dietary intake include food frequency questionnaires, 24-hour recalls, food diaries, and others, each with its own set of advantages and limitations.<sup>3</sup> To assess the quality of a diet, both a dietary intake method and a standard against which to compare the intake estimates must be selected. Validated diet quality indices might compare dietary intake to nutrient-based standards,<sup>4</sup> which is the foundation for the Total Nutrient Index, used to examine micronutrient exposure in United States adults.<sup>5</sup> Food-based indices compare the intake of food groups to food-based recommendations (such as the Food Pyramid) as per The Healthy Food Diversity Index.<sup>6</sup> The Healthy Eating Index combines both measures of food and nutrient intake, comparing individual intake to food groups and nutrient recommendations of the Dietary Guidelines for Americans. Indeed, higher Healthy Eating Index scores were associated with reduced risk of all-cause, cardiovascular, and cancer mortality and reduced risk of incident cardiovascular disease, cancer, type 2 diabetes, and neurodegenerative diseases.<sup>7</sup>

Attempts to assess diet quality in HD patients have been made, largely by adapting diet quality indices for the general population to modifications recommended in the HD population.<sup>8</sup> Associations between diet quality measured using such indices and outcomes including PEW, inflammation scores, first hospitalization, first cardiovascular event, all-cause, and cardiovascular mortality have been reported.<sup>9,10</sup> However, it seems clear that the development of HD-specific diet quality scores will enhance both our ability to predict clinical outcomes and identify dietary inadequacies before clinical manifestations are apparent.

In this issue of the *Journal of Renal Nutrition*, 24 articles are provided from investigators around the globe that range by topics on acute kidney injury, chronic kidney

disease (CKD), HD (including an article in children and an article on home hemodialysis), peritoneal dialysis, and kidney transplantation. The issue begins with an important and timely review of the publications on weight management for kidney transplant recipients; Pedrollo et al<sup>11</sup> report that a plethora of poor study designs have been published which complicates our ability to know what will work. Even with the randomized controlled trials these investigators located, benefits were lacking, demarcating the need for more rigorous research in this area. This issue of the *Journal* ends with a patient nutrition education piece for kidney transplant recipients.<sup>12</sup>

Elsewhere in this issue, Dwyer and Kelepouris<sup>13</sup> review the offerings of phosphate medication management and de Abreu et al<sup>14</sup> evaluate methods of reducing dietary phosphorus and potassium in the cooking process. The *Journal* also provides an evaluation of diet education materials regarding phosphorous. Picard et al<sup>15</sup> point out that most diet education materials currently available for patients with kidney disease recommend restricting plant proteins and whole grains and call for a revamp of the dietary phosphate teaching materials. In line with this recommendation, Lambert et al<sup>16</sup> examined the quality of printed diet education materials and found that most were written at the appropriate education level but only half met the criteria for understandability and that a poor 10% met criteria for clear communications. This reiterates the need for diet educators to become more fluent in developing teaching materials for patient with kidney disease. This begs the question on what tools should be used for evaluating the new online education materials using mobile applications. St-Jules et al<sup>17</sup> report on a rigorous randomized controlled trial examining standard versus remotely delivered nutrition education for a weight management study in patients with diabetes, CKD, and body mass index  $\geq 27$  kg/m<sup>2</sup>. Dietitians and patient educators should consider quality guidelines for material development and encourage more research in this area to promote best practices to benefit patients. Also related is a report from Brazil on the lack of access to dietitians for receiving diet education prior to starting dialysis in that country.<sup>18</sup> Baggio Nerbass et al<sup>18</sup> found that only 12% had access to a dietitian before chronic dialysis was initiated.

A report from the hemodialfiltration–Heart–Height study in children is provided by Paglialonga et al,<sup>19</sup> wherein they demonstrate weight and height were negatively associated with ghrelin concentration and that the type of dialyzer (conventional vs. hemodialfiltration) may

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1051-2276/\$36.00

<https://doi.org/10.1053/j.jrn.2022.12.001>

make a difference in these children. Another unique population is included in this issue of the Journal. Patients with acute kidney injury (AKI) were evaluated for predictors of requirement for dialysis within 90 days after an episode of AKI. Emuron et al<sup>20</sup> found that the Nutritional Risk Index could aid in assessing who will move on to chronic dialysis after AKI. Also, Pasricha et al<sup>21</sup> provide a case series of patients receiving nocturnal home hemodialysis which provides readers some insight into this intensive kidney replacement therapy and how the healthcare team select and care for patients having this therapy.

Betz and Penniston<sup>22</sup> and Moghari et al<sup>23</sup> both evaluated dietary acid load (DAL) in different applications. Betz and Penniston report on the impact of DAL in urolithiasis in patients with CKD<sup>22</sup> and Moghari et al<sup>23</sup> evaluated the DAL impact on predialysis bicarbonate concentration of patients on HD. Food availability during SARS-CoV-2 pandemic was reviewed in a study by Vargas-Vazquez et al.<sup>24</sup> Pourafshar et al<sup>25</sup> report from the National Health and Nutrition Examination Survey that United States adults with CKD consume too few fruits and vegetables.

Rizk et al<sup>26</sup> provide a report that contributes to the knowledge base for serum biomarkers for health and mortality risk in patients with CKD from the US Veteran population, highlighting the utility of cystatin-C as a nutrition status marker. Huang et al<sup>27</sup> provide an insight on markers of nutrition risk that correlate with high peritoneal transporters in patients on peritoneal dialysis. Elgenidy et al<sup>28</sup> report on their meta-analysis of serum zinc concentrations in patients with CKD and patients on HD compared to healthy controls. Barril et al<sup>29</sup> report on the utility of the Malnutrition-Inflammation Score applied in patients on HD in Spain. Perkins et al<sup>30</sup> evaluated a high-protein meal influence on circulating inflammatory biomarkers and muscle biopsy findings in patients on HD compared to healthy controls, providing more insight into the impact of HD on inflammation.

Biotic supplements are evaluated in reports from McFarlane et al<sup>31</sup> and from Chen et al.<sup>32</sup> McFarlane provides information on patient acceptance of these supplements using semi-structured interviews with patients having CKD.<sup>31</sup> Hearing the patient's voice is an integral part of understanding outcomes related to prescribing supplements or other approaches to improve nutrition status, thus making the methods used by these researchers broadly applicable. Chen et al<sup>32</sup> provide a meta-analysis of randomized controlled trials of probiotics, prebiotics, and synbiotics for patients on HD. They found these supplements to be useful for reducing inflammation.

Two studies report on sarcopenia in kidney disease. Beberashvili et al<sup>33</sup> assessed patients on HD for sarcopenia and sarcopenic obesity. They found that sarcopenic obesity was associated with higher levels of several nutrition biomarkers compared to patients with sarcopenia alone and

thus contribute to the understanding of the obesity paradox in HD. Zhou et al<sup>34</sup> found a prevalence of sarcopenia to be 36% in their HD population and correlated elevation of extracellular/intercellular water assessed by bioelectrical impedance analysis (BIA) which was independent of body mass index and other markers of sarcopenia risk. Hydration status estimated by BIA is also assessed in studies reported by Schotman et al<sup>35</sup> who question the accuracy of BIA for assessing changes in hydration status for patients on HD and Cheng et al<sup>36</sup> report that hydration changes impact the accuracy of muscle measurement in HD.

The Journal of Renal Nutrition begins 2023 with a series of reports that encourage all of us to engage in research to improve the care of patients with kidney disease. We hope you are challenged to be part of this venture!

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